

Field studies on the Black Parrot *Coracopsis nigra* in western Madagascar

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Certains aspects de la biologie du Perroquet noir *Coracopsis nigra* ont été étudiés pendant la période post-nuptiale, dans une forêt primaire sèche dans l'ouest de Madagascar, en 1994. À l'aide de layons, des données ont été recueillies concernant la recherche de la nourriture, le régime alimentaire, les patterns d'activité quotidiens, le répertoire vocal et le comportement social. L'espèce est essentiellement frugivore et paraît jouer un rôle important comme disperseuse de semences, mais se tourne vers les fleurs et les bourgeons dès que l'approvisionnement en fruits diminue. Les perroquets ne présentent pas de patterns d'activité quotidiens réguliers, sauf en ce qui concerne des périodes d'activité vocale élevée au lever et au coucher du jour, et une période pendant laquelle ils se chauffent au soleil et font leur toilette, juste après l'aube. Les activités nocturnes s'avèrent rares. L'espèce est relativement bruyante. Des cris de contact de courte et de longue distance, ainsi que des cris d'alarme ou d'agression sont décrits. Des imitations, qui ont été rapportées pour des oiseaux captifs, n'ont jamais été observées. Des perroquets à la recherche de nourriture ou d'un dortoir forment régulièrement des petits groupes comprenant jusqu'à dix individus. De mi-février à fin-mars, ni groupes familiaux, ni jeunes indépendants n'ont été observés, indiquant que la période de reproduction commence avant décembre, donc plus tôt que ne le décrit la littérature.

The genus *Coracopsis* consists of the two most primitive species of African parrots, Greater Vasa Parrot *C. vasa* and Black or Lesser Vasa Parrot *C. nigra*⁹. Both are restricted to Madagascar and the Comoro Islands, except for a small endangered population of *nigra* on Praslin Island, Seychelles¹². Both are listed in Annex II of the CITES Convention.

There have apparently been no field studies on Black Parrot (except for those on Praslin Island^{7,13}) and our poor knowledge of their biology elsewhere is principally gleaned from a few anecdotal reports made as a result of scientific expeditions^{18,15}. Some studies of captive *Coracopsis* have concentrated on their breeding biologies. An apparent polygyny and the development of a penis-like cloaca during the breeding period are considered to be unique within the Psittaciformes^{3,7,17,19,20}.

Black Parrot is reported to be less common and more restricted to closed woodlands than Greater Vasa Parrot, which is common in open cultivated areas throughout the Madagascan lowlands^{14,15}. Here I add to the biological knowledge of the Black Parrot in the wild. During three weeks in the early post-breeding period I systematically collected data on the species' activity patterns, food and foraging behaviour, acoustic communication, and social behaviour.

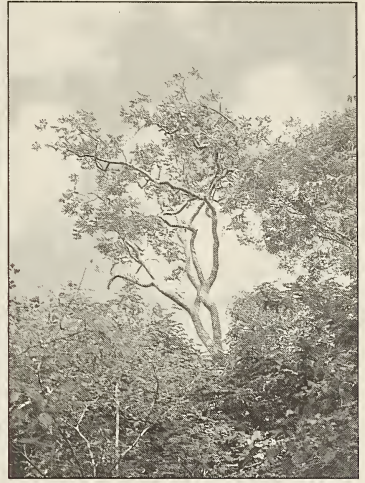
Study area and methods

The Forêt de Krinidy, a 100 km² concession of the Centre de Formation Professionnelle Forestière de Morondava (CFPF) is located c60 km north of

Morondava in western Madagascar. The climate is tropical with a mean annual rainfall of 770 mm and an intense dry season from April–October¹⁰. The vegetation consists of primary deciduous dry forest. Canopy height averages 12–15 m and sometimes reaches 20 m. For a detailed description of the area see Ganzhorn & Sorg¹¹. My study was conducted between 28 February–21 March 1994. Birds in the study area were recorded using line transects². Six transects, each 1 km-long, were established along narrow straight forest routes. Transect counts were conducted over a period of 30 mins and were performed systematically throughout the day. A total of 106 counts was made from 05.30–19.00 hrs (see Table 1). The minimum interval between two counts on the same transect was three hours.

Each parrot observation was recorded with the following data: time and calls, and, for sight records, the activity, height of birds above ground-level and group size were all noted. The call types were classified according to Thielcke¹⁸. Activities were categorised as follows: foraging, flight and non-locomotory behaviour. The latter category was further subdivided into: resting, sunning, preening and 'sit and call' (resting with persistent calling). For feeding observations, I recorded the food type and plant species.

For analysis of daily patterns I used only those transect data from T1–T4. Other quantitative results refer to all six transects. Non-quantitative results and general descriptions include supplemental observations from a simultaneous study commenced in mid-February 1994^{4,5}.



Views of the study area, Forêt de Kirindy, western Madagascar, 1994 (Arndt Hampe)

A total of 1,515 observations of 1,706 birds was recorded. Of these, 245 sight records concerned 388 individuals; 187 sightings with 262 activity data were analysed referring to the daily activity patterns, and data on foraging included 36 observations of 69 birds. Finally during the sight observations, a total of 334 call-only records were made.

Results

1. Daily activity patterns

The recorded parrot observations showed a strong morning peak about sunrise and a weaker afternoon peak (Table 2). Activities are recorded in Fig. 1.

On a few occasions, the first calls were registered before dawn (c.05.30 hrs). Around sunrise (c06.10

hrs) calling activity peaked. Just after dawn a period of preening and sunning commenced, which, except on one occasion, ended at 07.15 hrs. During this period, small groups of up to ten birds formed in the tops of dead trees (mean height 13.5 m). Thereafter, flight activities increased and at 07.10 hrs the first feeding was recorded. Between 08.00–09.00 hrs the proportion of resting or preening birds dropped to nearly zero, whereas flight and foraging activities reached their daily peaks. During most of the rest of the day the different activities did not show significant patterns. The last foraging observation occurred at 17.56 hrs. Few sightings were made before 06.00 hrs and after 18.00 hrs despite high call activity which suggests that during the night the species used less conspicuous sites than

Table 1. Number of transect counts throughout the day (T 1–6 = transect routes). Each hour was divided into two 30-min census units that were performed on different days.

hour	T1	T2	T3	T4	T5	T6	total
05.30–06.00	1	1	1	1	-	-	4
06.00–07.00	2	2	2	2	2	2	12
07.00–08.00	2	2	2	2	2	2	12
08.00–09.00	2	2	2	2	2	2	12
10.00–11.00	2	2	2	2	-	-	8
11.00–12.00	2	2	2	2	-	-	8
13.00–14.00	2	2	2	2	-	-	8
14.00–15.00	2	2	2	2	-	-	8
16.00–17.00	2	2	2	2	2	2	12
17.00–18.00	2	2	2	2	2	2	12
18.00–19.00	2	2	2	2	1	1	10
total counts	21	21	21	21	11	11	106

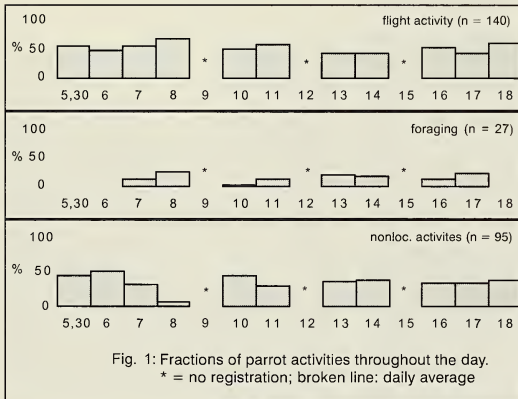


Fig. 1: Fractions of parrot activities throughout the day. * = no registration; broken line: daily average

at day roosts. Nocturnal activities, previously described in the literature^{1,16}, were only noted exceptionally.

2. Foraging behaviour and food

Parrots foraged alone or in small groups of up to five individuals (mean 1.9 birds). Foraging birds stayed at a mean height of 10.7 m, significantly lower than during non-locomotory behaviour (Mann-Whitney: $Z = -2.18$; $p = 0.005$; $n = 69$). During feeding, birds were normally silent or uttered soft short-distance contact calls (see Acoustic Communication).

The parrots fed exclusively on plants (Fig. 2). In early March they took only the fruits of *Commiphora guillaumini* (Burseraceae), *Poupartia silvatica* (Anacardiaceae) and *Breonia perrieri* (Rubiaceae). The first two species produce drupes rich in fats, whereas *Breonia perrieri* has multi-seeded fruits with

Table 2. Parrot observations

hour	individuals seen	number of sight observations	call records
5,30	15	12	69
6	79	49	184
7	63	35	92
8	45	28	85
9			
10	38	21	103
11	18	13	85
12			
13	19	13	87
14	11	9	89
15			
16	51	32	80
17	29	21	86
18	20	12	121
sum	388	245	1081

a high content of soluble carbohydrates (pers. obs.). The seeds were partially broken down in the bill (*Commiphora*, probably also *Poupartia*) or swallowed (*Breonia*). At *Poupartia* trees, the parrots had to retreat from the competition of lemurs *Eulemur fulvus* and *Propithecus verreauxi* on two occasions, whereas at the other tree species no interactions with other species were observed.

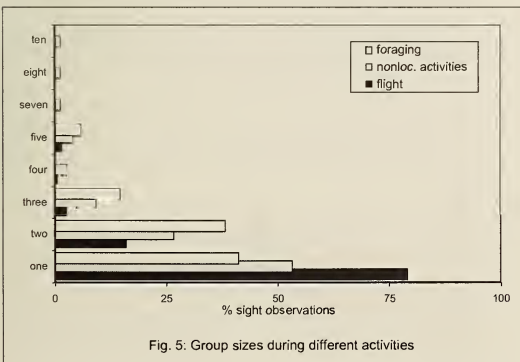
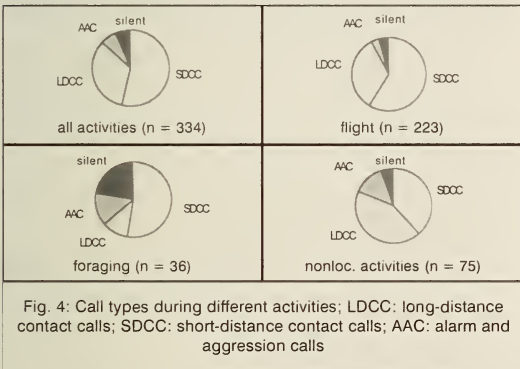
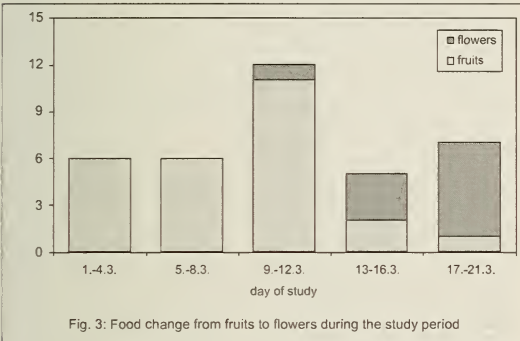
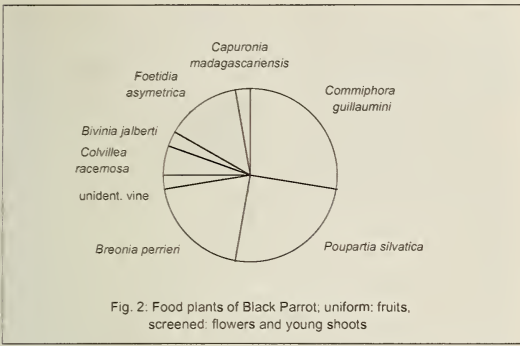
With diminishing fruit supplies, observations of birds feeding on flowers and young shoots increased. The following species were taken: *Capuronia madagascariensis* (Mimosaceae), *Colvillea racemosa* (Caesalpinaceae), *Foetidia asymetrica* (Lecythiaceae), *Bivinia jalberti* (Flacourtiaceae) and an unidentified woody vine species. The food change from fruit to flowers (Fig. 3) showed a highly significant trend in time (c^2 -Test: $c^2 = 21.15$; $df = 4$; $p < 0.001$; $n = 36$).

3. Acoustic communication

The species was relatively noisy: calling was recorded in 91.4% of all sight observations. Calling activity was highest in the mornings and much less pronounced in the evening (Table 2). Calls were classified according to three clearly distinguishable functional types.

A. Long-distance contact calls (LDCC)

The most striking call type consisted of motifs of 3–4 shrill fluty tones, often continually repeated. The maximum audible distance over which these were heard was more than 500 m. Three main motifs were



identified, one *wee too wee jio* being far the commonest. The main motifs varied in many ways: mainly by omitting or adding syllables, or altering the modulation and sometimes by linking the simple motif.

Calling birds were often found sitting more or less conspicuously in the canopy (engaged in non-locomotory activity 'sit and call': Fig. 4). Particularly in the morning and evening they regularly performed 'concerts': these being calling contacts between two or more birds, sometimes over distances of several hundred metres and lasting up to ten mins or more. During these contacts the parrots often synchronised their call motifs. Call frequency was c3-5 per min (higher in excited birds).

Long-distance contact calls were also regularly recorded in individuals seen flying high over the canopy, and, more rarely, during intraspecific aggression.

B. Short-distance contact call (SDCC)

During foraging and preening, or in flying groups, soft croaking short-distance contact calls were regularly recorded (Fig. 4). The normal type was a short monosyllabic call with a maximum audible distance of a few dozens of metres. Only during intraspecific aggression was it linked, becoming louder and occasionally rising to the same intensity as croaking aggression calls.

C. Alarm and aggression calls

The third type of calls consisted of a loud croaking, resembling that of African Grey Parrot *Psittacus erithacus*, although less harsh. The most common variant was monosyllabic. It was used principally as an alarm call. Sometimes calls of this type were recorded from parrots during 'sit and call' activity, and seemed to be connected with heightened excitement. Persistent croaking was recorded only in highly irritated or mobbed birds.

4. Social behaviour

The group sizes during roosting (mean = 2.0) and foraging (mean = 1.8) did not differ significantly, while flight activity was connected with significantly smaller groups (mean 1.3) than the other activities (Mann-Whitney: $Z = -5.04$; $p < 0.001$; $n = 279$) (Fig. 5).

During the entire field period, from mid-February, no observations suggested that family groups or independent young were being recorded. Roosting groups usually dispersed by the successive departure of single birds or pairs. Only on one occasion was a parrot fed by another bird during foraging.

Discussion

Black Parrots did not exhibit significant daily activity patterns, except for a period of intense preening and sunning before the start of foraging activity and intense calling activities ('concerts') in the morning and evening.

At the beginning of the study, the species was exclusively a frugivore but switched to other foods with decreasing food supplies. Foraging birds formed small groups compared to the flocks of up to c50 birds found in plantations¹² and could be a result of the fact that the most important fruits ripened successively and individual trees offered only small quantities simultaneously (for *Cammiphora guillaumini* see^{4,6}). The species is one of four mainly frugivorous species of bird in the study area and appears to be an important seed-disperser for several key tree species of western Madagascar forests^{4,5}.

Acoustic communication plays an important role in social behaviour. In the long-distance calls, the parrots demonstrated a high capacity for modulation and synchronisation. However, imitations as reported in captive birds¹⁶, were not recorded.

Captive breeding studies have shown that the breeding cycle of this species takes 2.5 months from egg-laying until the young become independent¹⁶. My failure to record families or independent young from mid-February onwards suggests that the breeding period starts prior to December, earlier than previously described^{15,16}. Finally, a pair-group fraction of 20.3% of all observations did not point to permanent adult pairing in the post-breeding period.

Outside tall dry forest, I never recorded parrot abundances as high as that in the study area. This suggests that, although the species is recorded in other habitats, primary dry forest appears to be the preferred habitat in western Madagascar during the early post-breeding period. In the study area, which was subject to low hunting activity, the parrots were relatively tame, as has been described by other authors^{8,9}, whereas outside this area the species was markedly shyer, suggesting that it suffers from more serious hunting pressure elsewhere.

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